

COOP Program



Program Briefing

April 2001





Background



- ✓ **Volunteer Network of Over 11,000 sites**
- ✓ **Critical Component of U.S. Weather Infrastructure**
- ✓ **Only Comprehensive, Nationwide, Unbiased Source of Weather & Climate Data**
- ✓ **Critical for Maintaining U.S. Climate Record**
- ✓ **Necessary for Drought & Climate Monitoring**
- ✓ **Key Input for Climate and Local Weather Forecasts**





Background: External Comments



- ✓ **“Vital component of the national observing capability for monitoring”** - *National Research Council (1998)*
- ✓ **“Critical to national drought policy for monitoring/prediction”** - *National Drought Policy Commission (2000)*
- ✓ **“Millions of small and large decisions, by public and private concerns, are based on COOP data”** - *National Research Council (1998)*
- ✓ **“Improved temperature forecasts from the modernized COOP network are key components of DOC’s response to the U.S. Energy taskforce”** - *Task Force Member*



NWS Challenges



✓ Drought & Climate Monitoring

- *Fill gaps in coverage – west & Alaska*
- *Make county-level data available*

✓ Snowfall Monitoring

- *Increase density/reporting for improved winter crop assessment/planning*
- *Currently only 1,500 sites report daily*

✓ Flood Forecasts

- *Increase number of gages per radar to improve radar precipitation estimates*
- *Reduce river height forecast error for improved flood mitigation decisions*



NWS Challenges (cont.)



✓ Temperature Forecast

- *Expand basis for local forecasts beyond 1,000 airport sites used today*
- *Make forecasts more representative of surrounding area*

✓ Data Availability

- *Expand real-time availability of observations beyond airports*
- *Eliminate current one day 2 months lag in COOP data availability*

✓ Data Accuracy and Quality

- *Standardize observing biases*
- *Improve and automate quality control of data*



Project Goals



- ✓ **Improve Drought & Climate Monitoring**
- ✓ **Improve Snowfall Monitoring**
- ✓ **Improve Flood Forecast Accuracy**
- ✓ **Improve Local Forecasts**
- ✓ **Increase Data Availability**



Improve Drought & Climate Monitoring



- ✓ **Improve Drought Monitor from 10 County to 3 County Resolution**
- ✓ **Provide Hourly Climate Data from 8,000 COOP Sites**
- ✓ **Eliminate Large Gaps in the West and Alaska**

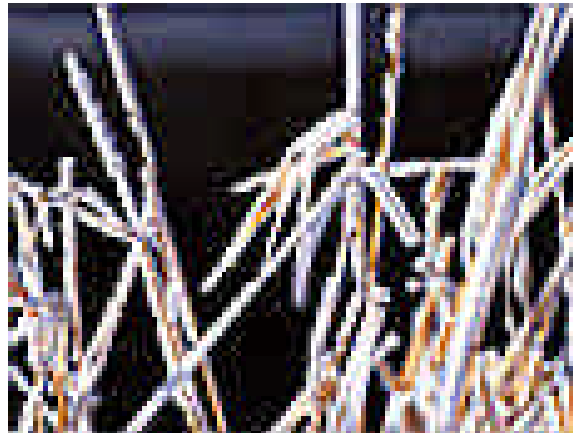
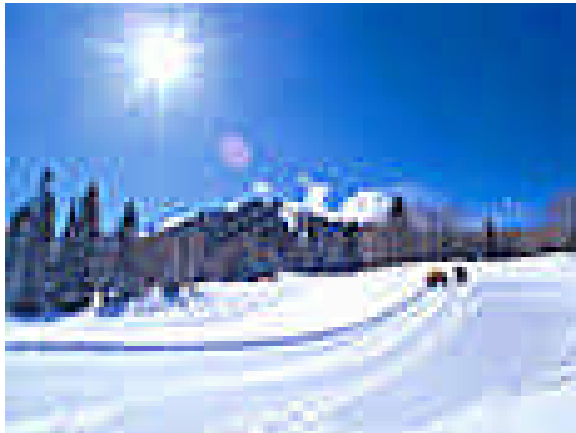




Improve Snowfall Monitoring

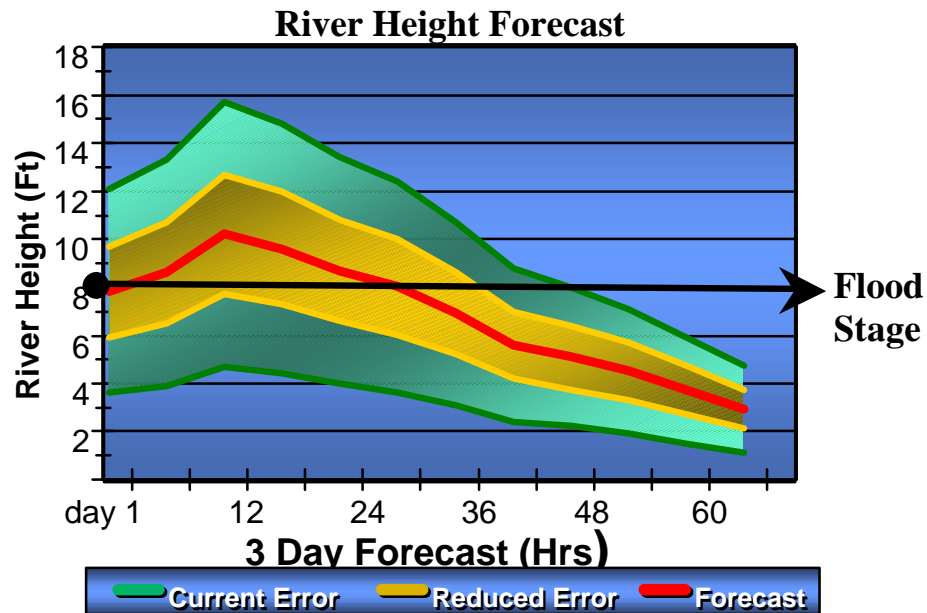


- ✓ **Provide Necessary Data for:**
 - ✓ *Winter Crop Assessment/Planning*
 - ✓ *Snow Melt Estimates*
- ✓ **Increase Snowfall Reporting COOP Sites from 1,500 to 8,000**



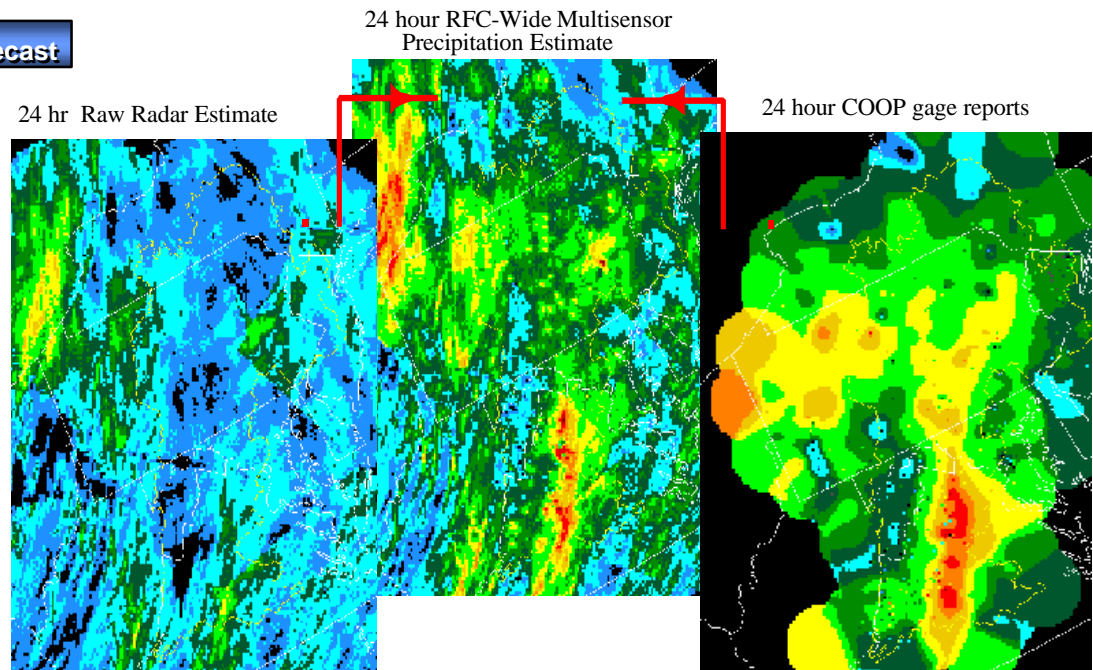


Improve Flood Forecast Accuracy



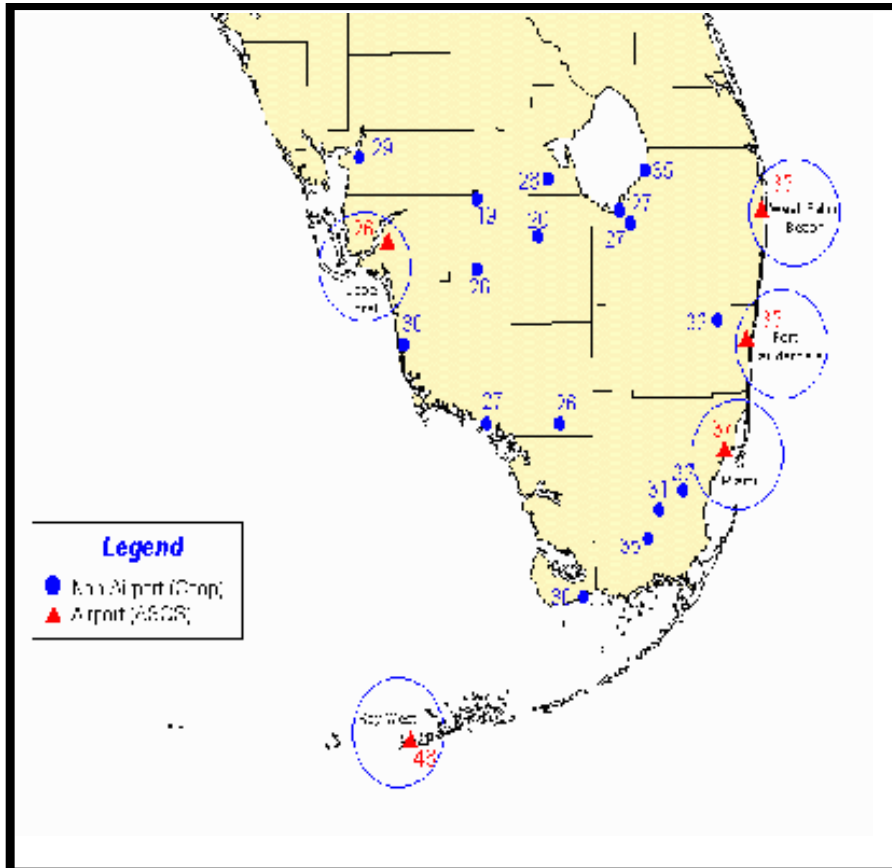
- ✓ Reduce Flood Forecast Error from 51% to 23%
- ✓ Improve River Height Forecasts Used in Flood Mitigation Decisions

- ✓ Improve Radar Precip Estimates by Increasing Number of Gages per Radar from 10 to 50



Improve Temperature Forecast Accuracy

- ✓ Decrease Temperature Forecast Error from 4.6° F to 3.1° F
- ✓ Increase Daily Reporting Temperature Sites from 1,500 to 8,000

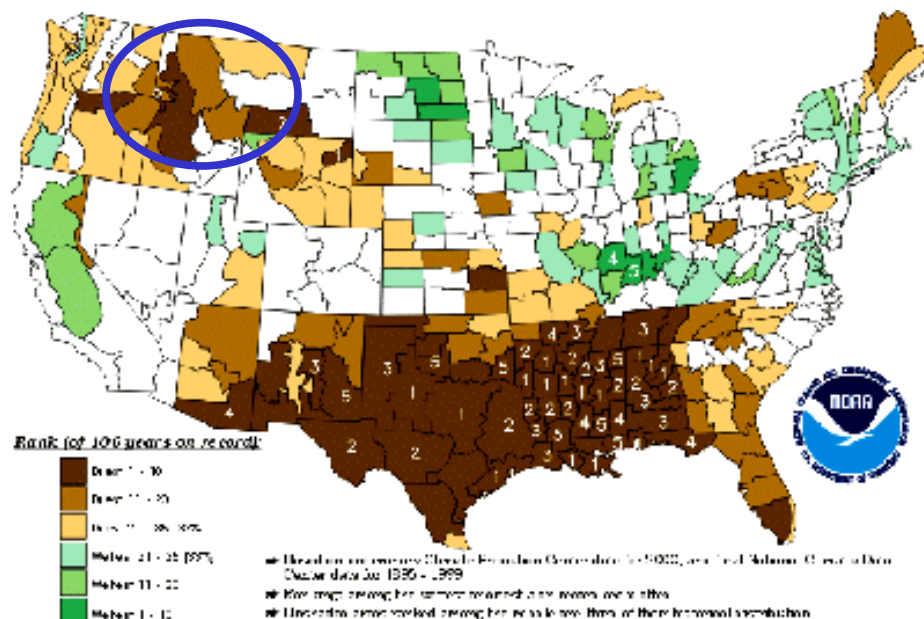


Devastating Florida Freeze January 18, 1997

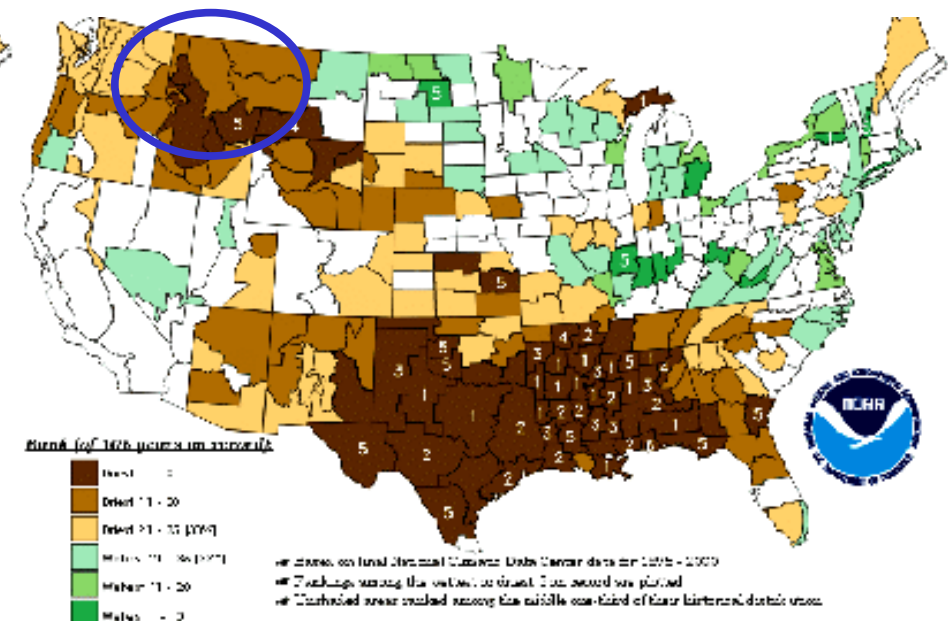
- Timely COOP observations would have allowed for more accurate county forecasts
- \$400 M in damages could have been mitigated

Increase Data Availability

- ✓ Provide Climate Data Hourly via the Internet
- ✓ Modernized COOP Will Provide Accurate Real-Time Information During Critical Situations
 - *Montana/Idaho Fires*



**Precipitation Estimates w/
Current COOP**



**Precipitation Estimates w/
Modernized COOP**

Actions

- ✓ **Modernize Temperature and Precipitation Gages at 8,000 sites**
- ✓ **Add Automated Data Communication, Dissemination, & Archiving to 8,000 Sites**
 - *Temperature and precipitation data reported every hour*
 - *Snowfall data reported every day*
- ✓ **Improve Spatial Distribution (Increase Density in West & Alaska)**
- ✓ **Equip 1,000 Sites with Soil Moisture, Temperature, Humidity, & Evaporation Sensors**
- ✓ **Disseminate All Data Via Internet**





Why is COOP the Solution?



- ✓ **COOP Network Already Exists as the Only Comprehensive, Nationwide, Unbiased Source of Weather and Climate Data**
- ✓ **Long-Term Drought Monitoring Improvements Directly Dependent on Additional Soil Moisture and Temperature Data**
- ✓ **Model Improvements Cannot Replace a Comprehensive, Real-Time Surface Observing Network**
- ✓ **Mesonets Have Problems with Uniformity and Reliability - Can Supplement, But Not Replace Official Surface Data**
- ✓ **Satellite Observations Do Not Report Surface Conditions Required for Local Forecasting and Climate Monitoring**



Outcomes: Modernized Network



Network Elements	Current Daily Reporting Sites	Goal Daily Reporting Sites	Economic Benefits
Temperature	1,500	8,000	<ul style="list-style-type: none">• Save Consumers \$30M/day per Degree Improvement• Seasonal forecast improvement
Precipitation	3,000	8,000	<ul style="list-style-type: none">• Local power prediction• Better water and drought management crop planning
Soil Moisture	40	1,000	<ul style="list-style-type: none">• Better water/drought mgmt./crop planning/spring flood outlook improvement
Snowfall	1,500	6,000	<ul style="list-style-type: none">• Better water/drought mgmt./crop planning/spring flood outlook improvement



Outcomes: Performance



Performance Metric	Current Capability	Goal
Climate Monitoring	1 day – 2 months	Available Hourly
Drought Monitor Resolution	10 county area	3 county area
24 Hour Temperature Forecast Error	+/- 4.6° F	+/- 3.1° F
Flood Forecast Error (River Height)	51%	23%



Outcomes: Economic Benefits



Agriculture

- ✓ Better Data for Local Decision Making (Water/Drought Management/Crop Planning)
- ✓ Droughts Cost Federal Govt. \$500M/yr.

Power Industry

- ✓ Improve Local Power Production/Pricing Efficiency
- ✓ Save Consumers \$70M/yr. per Degree Improvement

Weather Risk Industry

- ✓ Improve Market Efficiency of Climate/Weather Related Insurance Contracts
- ✓ \$ Billions and Growing

Federal Government

- ✓ Support County-Level Presidential Disaster Declarations for Drought, Snowstorms, Floods, etc.



Schedule



- FY 2001: Complete COOP network spacing plan (inter-agency network integration)
- FY 2003: Procure 1st 325 CWOSs & commence implementation
- FY 2004: Begin procurement & implementation of drought sensors
- FY 2010: Complete acquisition phase
- FY 2011: Complete implementation
- FY 2012: Steady-state network operation

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Temp./Precip	325	900	1,125	1,130	1,130	1,130	1,130	1,130
Drought Sensors		333	333	334	0	0	0	0